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(57) Abstract:

Problem to be solved: To efficiently select a program by enhancing the selection operability of the program desired for reproduction and viewing and to provide a utility form making best of features of a random access storage medium in a program video recording and reproducing device provided with the random access storage medium.

Solution: On a view program selection menu 161, where a list of video recording programs is displayed and a program desired to be reproduced and viewed, a reproduction history graph 171, that is a bar graph where a time zone of each video recording program having already been reproduced and viewed is

displayed in a rectangular bar, a reproduction end line 172 that indicates at which time the just preceding reproduction of the recorded program is finished, and a thumbnail video image 170 that is a small video image at a position indicated by the reproduction end line are displayed. Furthermore, a plurality of programs having repetitively been recorded on a specific weekday every week such as the 2nd row in the program list in the view program selection menu are displayed as one program and they can be reproduced by clicking a selection cursor 173.

[Claims]

[Claim 1] In refreshable program recording playback equipment, recording of a video audio of a program on a storage in which random access is possible and program recording playback equipment displaying a list of each recorded program and also displaying a graph that is selectable in a program to play from this list, and holds a playback history of each of the mentioned above recorded program, and with which the mentioned above playback history is expressed to the mentioned above list collectively.

[Claim 2] A program recording playback equipment that is the program recording playback equipment according to claim 1 characterized by displaying collectively a small screen picture of an image in time when the mentioned above each program is in the mentioned above list.

[Claim 3] A program recording playback equipment that is the program recording playback equipment according to claim 2 and an image displayed as the mentioned above small screen picture is characterized by that is an image at the end time of playback of each program using the mentioned above playback history currently held.

[Claim 4] A program recording playback equipment that is the program recording playback equipment according to claim 2 characterized by that an image displayed as the mentioned above small screen picture displaying a still picture of a program in a time interval defined preliminary.

[Claim 5] Program recording playback equipment which is the program recording playback equipment according to claim 2 characterized by that a correspondence part of a playback history, and the mentioned above graph shows change operating is possible and displays an image of a playback history part corresponding to this operation as the mentioned above small screen picture by a user.

[Claim 6] A program recording playback equipment that is the program recording playback equipment according to claims 1 to 5 characterized by that the reservation of picture recording of the program is carried out, a stored thing that is done for a list display for every genre when making a user choose a genre according to that program, combining this selected

genre with a program, storing it and displaying by the mentioned above list.

[Claim 7] A refreshable program recording playback equipment, a video audio of a program is recorded on a storage in which random access is possible characterized by the mentioned above playback selecting means displaying a graph that expressed visually a field already played from playback history information managed by the mentioned above playback history control means about each recorded program on the mentioned above list, including a recording program information management tool that manages recording information about each recorded program, a playback history control means to manage information about a segment of time played about each recorded program, a view program selecting means that can choose a program displays a list of programs recorded using recording information managed by the mentioned above recording program information management tool and a user expects playback from the mentioned above list.

[Claim 8] The program recording playback equipment according to claim 7 characterized by that the mentioned above view program selecting means combines a small screen picture of an image in time the mentioned above program to be with the mentioned above list and displays it about each recorded program.

[Claim 9] The program recording playback equipment according to claim 8 characterized by that the mentioned above small screen picture is an image of a part that interrupted playback immediately before based on playback history information managed by the mentioned above playback history means.

[Claim 10] The program recording playback equipment according to claims 1 to 9 characterized by that is shown on a position to which a part where a field which the mentioned above graph made picture recording times of a program whole length, and was already played is a bar graph expressed as a rectangle, and ended playback immediately before corresponds in the mentioned above bar graph at a line.

[Claim 11] In a refreshable program recording reproduction method, recording of a video audio of a program on a storage in which random access is possible and recording information about each recorded program is managed and playback history information about a played segment of time about each recorded program is managed and a program recording reproduction method displaying a graph that expressed visually a field already played from the mentioned above playback history information about each program currently displayed on the mentioned above list when displaying a list of programs stored using the mentioned above recording information.

[Claim 12] The program recording reproduction method according to claim 11 combining a small screen picture of an image in time the mentioned above program to be with the mentioned above list, and displaying it about each program currently displayed by the mentioned above list.

[Claim 13] The program recording reproduction method according to claim 12 characterized by that the mentioned above small screen picture is an image of a part that interrupted playback immediately before based on the mentioned above playback history information.

[Claim 14] In refreshable program recording playback equipment, recording of a video audio of a program on a storage in which random access is possible and including a recording program information management tool that manages recording information about each recorded program, and the mentioned above recording program information, program recording playback equipment eliminating automatically an old picture recording program that saves about each program by which division recording of the continuation program was carried out by the number of times which a user specified from a program of the newest recording time and exceeds a part for the mentioned above number of times.

[Claim 15] A refreshable program recording playback equipment, a video audio of a program playing the program concerned if the mentioned above user chooses

this list is recorded on a storage in which random access is possible, including a recording program information management tool that manages recording information about each recorded program, a view program selecting means as which display a list of programs stored using recording information managed by the mentioned above recording program information management tool and a program that expects reproduction of a user is made to choose from the mentioned above list and in a recorded program, in the mentioned above list, the mentioned above view program selecting means collects each program by which division memory of the continuation program was carried out as one program and displays it.

[Claim 16] The program recording playback equipment according to claim 14 or 15 characterized by that a user can specify the number of times of recording preservation of specification of a continuation program, and the mentioned above continuation program at the time of reservation of picture recording.

[Claim 17] A program recording reproduction method eliminating automatically an old picture recording program that recording information about each recorded program is managed, and recording time carries out recording preservation by the number of times that a user specified from the newest program about each program by which division recording of the continuation program was carried out based on the mentioned above recording information, and exceeds a

part for the mentioned above number of times, in a program recording reproduction method that records a video audio of a program on a storage in which random access is possible, and is played.

[Claim 18] A program recording reproduction method playing the program concerned if each program by which division recording of the continuation program was carried out is collected as one program, and is displayed in the mentioned above list in a recorded program and the mentioned above user chooses this list, in a program recording reproduction method that records a video audio of a program on a storage in which random access is possible and is played, recording information about each recorded program is managed, when displaying a list of programs recorded using the mentioned above recording information.

[Detailed description of the invention]

[0001]

[Field of the invention] This invention relates to the program recording playback equipment and the method of recording an image or a sound of a program provided with the storage in which random access is possible, etc. (in this specification, «recording» of recording an image, a sound, etc. on a recording medium is written). It is related with the program recording playback equipment and the method of the program reservation and playback in which the feature of the random access

storage was harnessed especially being possible, and choosing and playing the recorded program efficiently.

[0002]

[Description of the prior art] In recent years by the improved efficiency of the storage that is represented by development and the hard disk drive of digital image audio compression technology, such as MPEG 2, and in which random access is possible. The program recording playback equipment that can carry out recording accumulation of the digital compressed image of several to tens of hours of television broadcasting programs, such as a terrestrial wave and satellite broadcasting, at a mass storage, and can be played is being put in practical use, and, generally it is called the home server.

[0003] On the other hand, the television broadcasting program recording playback equipment (videotape recorder: VTR) using the magnetic tape medium represented by the VHS method etc. has spread widely. Recording record of about a maximum of 9 hours is possible for these devices, and reservation of picture recording can be performed by specifying preliminary the time of the program broadcast in the future.

Operation of VTR is a user inserting a tape in a device and reproducing by pulling out the head of the program wishing playback by manual operation fundamentally.

As easier and efficient operation, the information on the reservation of picture recording what kind of program other than a program image is recorded in what kind of order, by storing to the necessary field of videotape.

When playing later, the contents of recording of a tape can be displayed based on the information on the field, the videotape recorder that makes it easy that a user discovers a desired picture recording program is marketed, and, generally these functions are called the navigation function and the document library facility.

[0004] In these functions, it plays by pulling out the head of a tape to the head of the field where the program that was made to choose the program which presents recording information currently first recorded on the present tape by the user, such as video recording start time of each program, a channel, picture recording times (length), and expects playback of a user, and was chosen is recorded. Thus, a user does not perform search or reproduction operation of a tape manually, but rather than program recording information, based on the information that it is concrete and is easy to understand, can choose a program and can be reproduced.

[0005]

[Problems to be solved by the invention] However, such a navigation function and a document library facility are insufficient for applying to the home server provided with the mass storage medium in which random access is possible by the following reason.

[0006] Although prolonged recording is possible for a home server in the first place compared with VTR and so many programs are recorded on it, there is a problem that there are few functions in choosing and playing the program of hope from the program of such a large number. With VTR, since the picture recording times of one tape are about a maximum of 9 hours, it is thought that the program numbers currently recorded on one tape on the average are several number group and about at most ten programs. For this reason, a navigation function etc. are considered that it is easy to guess a program content for the information about the channel number shown at the time of the program selection wishing playback or recording time. However, in a home server the maximum number of the recording of about 10 hours is possible and, for this reason, it is expected that the program number that can be recorded will also be ten or more programs. Thus, just the conventional recording information is insufficient for choosing a program number like this.

[0007] Unlike the tape that is a sequential access storage medium, the home server uses the second storage in which random access is possible, but there is a problem that the operation body system that pulls out the characteristic of this random access is not equipped. Since it is not necessary to record recorded image audio data on the field that continued physically as a feature of recording playback using a random access storage, it

is dramatically easy to change an order of a program freely to the free space divided without being restricted to a pause of a picture recording program like a tape, and to play regardless of the order of recording time, to it that it can record continuously. thus, the program (a weekly specific day of the week) repeatedly broadcast, for example in a specific time zone. When recording the serial drama etc. that are broadcast at a specified time zone by several times and choosing the program wishing playback, in order to search easily, they are collectively shown as one program, with old VTR that the newest news and weather report are renewable at any time on updating automatically only a part for the newest broadcast of news or a weather report broadcast in the time zone decided preliminary, and recording it, the usage pattern that was difficult to realize becomes possible in a home server. However, the conventional method is not equipped with the operation body system that realizes these usage patterns.

[0008] The purpose of this invention is as follows. It can be made in view of the mentioned above problem of conventional technology, the selection operation nature of a program to view can be improved, and a program can be chosen efficiently. Provide the program recording playback equipment and the program recording reproduction method which harnessed the feature of the random access storage.

[0009]

[Means for solving the problem] In program recording playback equipment in which the 1st program recording playback equipment of this invention records a video audio of a program on a storage in which random access is possible, and is played, a recording program information management tool that stores and manages recording information, such as recording time of a picture recording program, we decided to have a playback history control means to manage a playback history which part of a picture recording program was already played, and a view program selecting means as which a program to display a picture recording program list based on information on a recording program information management tool, play and view from the inside to a user that is made to choose it. And this view program selecting means was made to display a graph that expressed visually a part already played based on information on a playback history control means in a picture recording program list, and a part that ended playback just before. It decided to also display a small screen picture (thumbnail) in time each picture recording program to be during a program list.

[0010] By such composition, the user can judge intuitively which already watched which program out of a program recorded from a graph that shows a playback history, if a picture displayed by a thumbnail is the part that finally ended reproduction, it will become easy to

select a program to reproduce, view from many programs further.

[0011] In program recording playback equipment in which the 2nd program recording playback equipment of this invention records a video audio of a program on a storage in which random access is possible, and is played, we decided to have a recording program information management tool that stores and manages recording information, such as recording time of a picture recording program, and a view program selecting means as which display a picture recording program list based on information on a recording program information management tool and a program to play, view to a user that is made to choose it from the inside. And this recording program information management tool left only the number of times of recording preservation that a user specified from the newest recorded part about a program repeatedly recorded on a specified time zone of a weekly specific day of the week, etc., and was made to eliminate a part for recording older than it automatically. A view program selecting means displays a plurality of programs recorded repeatedly as one settled program, chooses them, and enabled it to play them.

[0012] By such composition, a user about continuation programs broadcast at a weekly specific day of the week, such as news and a drama. It becomes possible to choose easily a program divided into always saving

only the newest program or multiple times as one program, and in a sequential storage like the conventional tape, realization can harness difficult random access storage and an operation body system with sufficient reliance user-friendliness can be obtained.

[0013]

[Embodiment of the invention] Below, a drawing is used and explained about an embodiment of the invention.

[0014] Drawing 1 shows an example of hardware constitutions that realizes the program recording playback equipment in an embodiment of the invention. In drawing 1, analog broadcasting waves, such as CATV broadcast received by the satellite broadcasting received with the antenna, terrestrial broadcasting, and a cable, are tuned in to the channel that was supplied to the tuner 101 and controlled by the system controller 106. The analog video audio signal of the tuned-in channel is outputted as it is through the selector 108, when program recording playback equipment is tuner operation, and the digital encoder 102 is supplied at the time of recording operation. At the time of recording operation, an analog video audio signal is changed into digital image speech information, such as MPEG 2, by the digital encoder 102 by control of the system controller 106, the changed digital image speech information is supplied to the data storage 103 and it is

accumulated. Although it is common to be constituted using a magnetic disk drive, an optical disk unit, and optical-magnetic disc equipment as for the data storage 103, as long as a mass semiconductor memory device is realizable in the future, a semiconductor memory device may be used.

[0015] When program recording playback equipment performs reproduction motion, the digital image speech information of a reproduction program is supplied to the digital decoder 104 from the data storage 103 by control of the system controller 106, and it is compounded with an analog video signal and audio signals, such as NTSC, and is outputted by the switch 108. About a video signal, OSD (onscreen display) 105 is overlapped on the interactive screen and information screen which the system controller 106 outputs at the time of recording reproduction operation, etc. Thus, the operation screen of reservation of picture recording or view program selection can be piled up and displayed on the image of the program outputted from the tuner 101 or the digital decoder 104.

[0016] The microcomputer in which the system controller 106 makes the core of a software processing function, the random access memory and the read-only memory holding a program or data, it includes a real-time clock etc. that maintain current time for the I/O controller for controlling peripheral equipment, recording time of day control, etc., each hardware of

program recording playback equipment is controlled as mentioned above, and processing of the recording reproduction motion of a program, a user's reservation of picture recording, view program selection, etc. is realized. Including the button and remote controller that have been arranged in the front panel of a device, the final controlling element 107 inputs a user's operation and informs the system controller 106.

[0017] Although the example of hardware constitutions of the recording playback equipment explained so far was an example for an analog broadcasting wave, it may be aimed at the digital broadcasting wave using digital image speech information, such as MPEG 2.

[0018] Next, the example of button arrangement of the remote controller which is an example of the final controlling element 107 of the program recording playback equipment in this embodiment is shown on drawing 2, and the outline of operation over button grabbing of the program recording playback equipment in this embodiment is explained. Drawing 2 shows only the button arrangement part required in order to operate the program recording playback equipment in this embodiment.

[0019] The program recording playback equipment in this embodiment was divided roughly, consists of four operational modes, and is called the «tuner operation mode», «reservation of picture recording mode», «view program selection mode» and «reproduction mode»,

respectively. The tuner operation mode is the mode which outputs the video audio of the channel tuned in with the tuner 101 as it is, and it shifts to this mode by carrying out the depression of the tuner button 122 of drawing 2 fundamentally. Reservation of picture recording mode is the mode that inputs the broadcast channel of a program, start time, finish time to record, etc., and it shifts to this mode by carrying out the depression of the reservation button 121 fundamentally. View program selection mode is the mode for choosing a program to display the recorded program list, and play, view out of it, and it shifts to this mode by carrying out the depression of the viewing button 123 fundamentally. Reproduction mode is the mode that plays the recorded program, and when the reproduction button 129 is pushed in the tuner operation mode after the program to view in view program selection mode was chosen or reservation of picture recording mode, it shifts to this mode. At reproduction mode, special reproduction can be operated by carrying out the depression of the rewinding reproduction button 132, the fast forwarding reproduction button 132 and the pause button 133. The stop switch 130 is a button for stopping program reproduction in reproduction mode, and if a depression is carried out, it will shift to the tuner operation mode. The up button 124, the down button 125, the left button 126, the right button 127, and the determination button 128 are used for operation of

the input of reserved information, selection of the program wishing viewing, etc. in reservation of picture recording mode and view program selection mode. The above operation outline is summarized to a tabular format, and it is shown on drawing 3.

[0020] Next, the screen constitution in the reservation of picture recording mode of the program recording playback equipment in the 1st embodiment of this invention is explained in detail using drawing 4.

Although reservation of picture recording is already inputted into the reservation of picture recording screen 141, the entry which recording has not completed yet, and the entry for new reservation of picture recording are displayed as a list sequentially from the early thing of reservation of picture recording time. A list of the reservation of picture recording screen 141 the part displayed to a lengthwise direction. The recording day selected area 143 where the date and day of the week of the channel number selected area 142 and a recording reserved program that the channel of a recording reserved program is inputted and are displayed are inputted and displayed, the video recording start time selected area 144 where the video recording start time of a recording reserved program is inputted and displayed, the recording finish time of the recording reserved program includes the recording finish time selected area 145 inputted and displayed and the genre selected area 146 that the genre of a recording reserved

program is inputted and is displayed. Each entry supports each line of a list and the recording information corresponding to each field is displayed. In addition to date specification of «11 (water)» etc., the recording day selected area 143 also enables repetition recording specification of the «every week month», «every week fire», «every week water», an «every week tree», «every week gold», the «every week ground», «the month to gold», etc.

[0021] For example, water, the 11th of the month when, as for the first line, the reservation of picture recording day performed recording reservation operation by 8 in the channel number when its attention was paid to the list of the reservation of picture recording screen 141 of drawing 4, video recording start time shows that the genre of a program is specified as a «drama» exactly at 20:00, and reservation of picture recording of exactly 18:00 and the recording finish time is carried out. Since it is enough if the reservation from the day that operates reservation specification to a maximum of one-month after is possible for reservation of picture recording, although the display and input about a year and the month do not have a line crack in the recording day selected area 143, the information on the years obtained from the real-time clock in the system controller 106 as internal recording information is managed too. The icon that expresses the genre of a program directly and graphically, and the genre name corresponding to it are

displayed on the genre indicator 146. An example of the genre displayed on the genre selected area 146 is shown on drawing 5, and may also contain what expresses an individual's liking like a «favorite» in addition to what divides program contents, such as «news», «weather» and «movie», by general classification.

[0022] The reservation cursor 147 that shows that it is an input object by changing a color and a shade about the entry line which also serves as the present input object on the reservation of picture recording screen 141, the input focus 148 that shows the field which is the present input object to the entry with reservation cursor by a rectangular frame is displayed too.

Reservation of picture recording mode is internally divided into cursor advance mode and focal move mode, the mode for cursor advance mode moving the reservation cursor 147 up and down, and making the entry of an input object change, and the reservation cursor 147 is displayed, and the input focus 148 is not displayed, it is the mode for focal move mode moving the input focus 148 to right and left about an entry with the reservation cursor 147, choosing an input object field, and performing alter operation of a field value, and the reservation cursor 147 and the input focus 148 are displayed. Drawing 4 shows that it is an input object entry line in the reservation cursor 147 existing in the 3rd line, and shows receiving the input of the present recording finish time in the input focus 148 existing in

the part of a «minute» display of the recording finish time selected area 145.

[0023] Next, it is explained in details, referring to the flow chart shown on drawing 6 about the operation procedure in the reservation of picture recording screen 141. If it shifts to reservation of picture recording mode from other modes by the depression of the reservation button 121 as shown on the table of drawing 3, operation processing will be performed according to the flow chart «reservation of picture recording» of drawing 6. Based on recording reservation information, the information on the existing recording reserved program is first expressed on the reservation of picture recording screen 141 as Step S101 as a list at the early order of reservation of picture recording time. Next, in Step S102, a new reservation entry is added and displayed on the entry of the last of a list. It is shown that this new reservation entry has not inputted each field by the initial value of each field being shown by «-». The reservation cursor 147 is set as the line of a new reservation entry at Step S103, the variable modifyMode is set to false at Step 104, and it sets up so that the internal mode in reservation of picture recording mode may be cursor advance mode. Although the reservation cursor 147 is also expressed as Step S105 according to setting out, in an initial state, it will be displayed on the line of a new reservation entry.

Next, the variable modifyMode is counted at Step S106 and if it is true processing is advanced to Step S119 that will process focal move mode to Step S107 that will process cursor advance mode if it is false.

[0024] In processing in cursor advance mode, if waiting and an input are performed in the button input from a remote controller in Step S107, it will progress to Step S108. At Step S108, if an input button is the up button 124 or the down button 125, it will progress to S109, otherwise, will progress to S110. At Step S109, an input button is the up button 124, and if a reservation entry is above the present reservation cursor line, the reservation cursor 147 will be set as the reservation entry, an input button is the down button 125, and if a reservation entry is below the present reservation cursor line, the reservation cursor 147 will be set as the reservation entry, and it returns to S105. At Step S110, if an input button is the determination button 128 and that is not right to Step S111, it will progress to Step S113. At Step S111, input focus is set as the channel number selected area 142 of the reservation entry of a line with reservation cursor, the variable modifyMode is set as true in Step S112, and it changes to focal move mode, and returns to Step S105. On the other hand, when an input button is the tuner button 122 at Step S113, it goes to a tuner screen, otherwise, when an input button is the viewing button 123 at Step S115, it goes to a view program selection picture, otherwise,

when a button is the reproduction button 129 at Step S117, it goes to a reproduction screen.

[0025] In processing of focal move mode, the rectangle showing input focus is displayed on the field that has the present input focus in Step S119. Next, if an input button is the left button 126 or the right button 127 in waiting and Step S121 in Step S120 about the button input of a remote controller, and that is not right to Step S122, it will progress to it at Step S123. At Step S122, in accordance with the right and left of a button, the input focus 148 is moved to right and left, and it returns to Step S105. the field which has the present input focus 148 in Step S122 carrying out a left end, it is not made to move to the left or the right field in the case of a right end. About the field of start time and finish time, a «time» part and a «minute» part consider it as an input focus object, respectively. For example, drawing 4 shows that the input focus 148 of the 3rd-line reservation entry is in the «minute» part of reservation end time. Next, if the input button is the up button 124 or the down button 125 in Step S123, it will progress to Step 124, otherwise, will progress to Step S125. At Step S124, the value of a field with the input focus 148 is united with the upper and lower sides of a button, and it returns to change and Step S105.

[0026] The change of the value in Step S124 is as follows, when the input focus 148 is in the channel number selected area 142, one step of channel numbers

are made to fluctuate in accordance with the upper and lower sides of a button. When the input focus 148 is in the recording day selected area 143, in accordance with the upper and lower sides of a button, in the case of a date, it fluctuates, and, in the case of the «every week month» etc., a change for the next candidate is made. For example, if the up button 124 is pushed when the contents of the present recording day selected area are «31 (Mon.)», it will change on an «every week day», and if the up button 124 is pushed further, it will change with the «every week month». If an up button is pushed succeedingly, it will continue with «every week fire», «every week water», «every week tree», «every week gold», «every week ground», «gold from the month», and «1 (Tue.) ». When the input focus 148 is in an each «time» part and a «minute» part, a «time» and the value of a «minute» are made to fluctuate in accordance with the upper and lower sides of a button video recording start time selected area 144 and recording finish time selected area 145. When the input focus 148 is in the genre selected area 146, it changes to another genre preliminary decided from the present genre in accordance with the upper and lower sides of a button.

[0027] At Step S125, if an input button is the determination button 128, it will progress to Step S126, otherwise, will progress to Step S127. At Step S126, an entry with the reservation cursor 147 is a new entry,

when it includes a non-input area, it progresses to Step S127, otherwise, it progresses to Step S128. The line that has the reservation cursor 147 in drawing 4 is an example of the new entry which includes a non-input area in the recording finish time selected area 145 and the genre selected area 146. At Step S127, since an entry with the reservation cursor 147 is a new entry including a non-inputted item, it indicates that it cannot shift to cursor advance mode, and returns to Step S105. At Step S128, the variable modifyMode is set as recording reservation information at Step S129 at false reflecting the contents of the entry with the reservation cursor 147 and it changes in cursor advance mode and returns to Step S105.

[0028] Based on the information on a recording reserved program that it was inputted on the reservation of picture recording screen as mentioned above, the system controller 106 accumulates the video audio of the channel specified as the recording start time as which each recording reserved program was specified in the data storage 103.

[0029] Next, the screen constitution in the view program selection mode of the program recording playback equipment in the 1st embodiment of this invention is explained in details using drawing 7. The recording information etc. of the recorded program corresponding to the genre chosen by the genre indicator 162 are displayed on the view program

selection picture 161 as a list in order of what has early recording time. In addition to one of the genres shown on drawing 5 by operation from a remote controller, the genre indicator 162 can also choose the element of «all». The thumbnail indication field 163 where, as for the part as which the list of recorded programs is displayed, the thumbnail image 170 that is a small image of the specified part of a program is displayed on a lengthwise direction, the channel viewing area 164 which displays the number of a recording channel, and the recording date viewing area 165 which displays the recorded date, it includes the recording day of the week viewing area 166 which displays the recorded day of the week, video recording start time viewing area 167 tat displays video recording start time, the recording finish time viewing area 168 that displays recording finish time, and the playback history display field 169 that displays the viewing playback history of a picture recording program. It is displayed on each field which the recording information of the recorded program corresponding to the genre chosen as each line of a list by the genre indicator 162 mentioned above. Also, the selection cursor 173 that shows that it is a selection object by changing a color and a shade about the program used as the present selection object is displayed in the view program selection picture 161.

In addition to a line with a program, the selection cursor 173 can be moved also to the genre indicator 162, and can change the present genre in that case.

[0030] In the list currently displayed by drawing 7, a genre is a «movie» and 2 recorded programs corresponding to this genre are displayed. «All» genre is a case that is shown on drawing 8, all the recorded programs are displayed in this case, each recorded program in the upper left of the thumbnail image 170 finishing the icon (it indicates to drawing 5) that shows the genre of that program is displayed. The 2nd line has the selection cursor 173 and it is shown that this program is chosen now.

[0031] The playback history graph 171 that is a bar graph which displays with a rectangle the segment of time to which it viewed and that made whole length the picture recording times (length) of the recorded program corresponding to each line, waved to the playback history display field 169 according to the picture recording times of the program, and already played, the reproduction end line 172 that shows where the playback in front of the recorded program was completed on the playback history graph 171 is displayed. At drawing 7, in the recorded program of the 1st line of the list, since playback is omitted yet, a rectangle is not displayed on a playback history graph, but the reproduction end line is displayed on the part corresponding to video recording start time.

The rectangle that shows that it reproduced about 45 minutes, and was similarly viewed about the 2nd line is displayed on the reproduction history graph, and the reproduction end line is displayed on the part that passed about 45 minutes from the head.

[0032] Although the small screen picture of the part shown with the reproduction end line 172 about each recorded program is displayed on the thumbnail indication field 163, in this embodiment, an animation image shall be reproduced only about a line with the selection cursor 173 mentioned below and a still picture shall be displayed about the other line. Even if the digital encoder 104 can reproduce only one image simultaneously by this, the thumbnail indication field 163 can be used effectively.

[0033] However, the display technique of the thumbnail in this invention, not the thing to restrict to this example, but the reproduction end line in a viewing history bar is right and left movable according to a user's operation, it may constitute so that the picture of the reproduction time position according to that movement may be chosen as a thumbnail image and may be displayed, and the suitable time interval is decided preliminary, and it may constitute so that the still picture of the reproduction time position in this time interval may be displayed one after another as a thumbnail image.

By constituting in this appearance, the effect of becoming easy to grasp what kind of thing the whole program being is expectable.

[0034] Constituting so that the picture of the time position preliminary decided for every genre may be chosen as a thumbnail image and may be displayed as the display technique of a thumbnail is also considered. It may constitute so that the still picture and video of a time position in which the specific button (for example, «mark» button) of the remote controller was pushed during program reproduction may be chosen as a thumbnail image and may be displayed as the display technique of a thumbnail, in the case of a continuation program, it may constitute so that the position marked about any one program in it may be applied to parts for other program. If it chooses as a thumbnail image that displays the part out of which the title of «No story» comes, for example in a drama program by constituting in this appearance, the effect that selection of the accumulated program becomes still easier is expectable. The display technique of the thumbnail in this invention is not restricted to the mentioned above example, and can consider various embodiments.

[0035] Next, it is explained in details, referring to the flow chart shown on drawing 9 about the operation procedure in the view program selection picture 161. If it shifts to view program selection mode from other modes by the depression of the Viewing button 123 as

the table of drawing 3 showed, operation processing will be performed according to the flow chart «viewing selection» of drawing 9. With reference to the variable CurGenre that expresses the current genre of the view program selection picture 161 with Step S201 first, the genre name is displayed on the genre indicator 162, and the list of the recorded programs belonging to the genre is displayed in order of what has early recording time. Next, with reference to the variable CurProgram that shows a program with the selection cursor 173, the selection cursor 173 is expressed in the line of the program as Step S202. The variable CurProgram can also refer to the genre indicator 162 by having the special value which was decided preliminary in addition to the program under list, and displays the selection cursor 173 on the genre indicator 162 in this case. At Step S203, when the variable CurProgram refers to a program, the thumbnail image of the part corresponding to the reproduction end line 172 of the program is reproduced with video only about the program, and the thumbnail image of other programs is displayed with a still picture.

[0036] Next, if it is waiting about the button input in a remote controller at Step S204 and an input button is the up button 124 or the down button 125 at Step S205, it will progress to Step S206, otherwise, will progress to Step S207. At Step S206, the value of the variable

CurProgram is changed and it returns to Step S202 so that the program of on the program that the selection cursor 173 has chosen in accordance with the upper and lower sides of a button now or the bottom may be referred to. When the up button 124 is pushed in the state where the variable CurProgram has chosen the upside program most, it changes into the special value that was able to decide the value of the variable CurProgram preliminary that the selection cursor 173 is displayed on the genre indicator 162. When the down button 124 is pushed in the state where the variable CurProgram has chosen the lower program most, the value of the variable CurProgram is not changed. Similarly, when the selection cursor 173 is shown on the genre indicator 162, with the up button 124, the value of the variable CurProgram is not changed, but with the down button 125, the value of the variable CurProgram is changed so that the selection cursor 173 may point out the program of the top part of a program list. For example, although the selection cursor 173 is in the program of the 2nd line in drawing 7, the selection cursor 173 moves to the program of the 1st line by the depression of the up button 124 and if the depression of the up button 124 is carried out further, it will move to the genre indicator 162. Even if it pushes the down button 125 in the state of drawing 7, the selection cursor 173 does not move.

[0037] At Step S207, if an input button is the left button 126 or the right button 127, it will progress to Step S208, otherwise, will progress to Step S211. At Step S208, if it judged whether the value of the variable CurProgram being a special value decided preliminary and the selection cursor 173 that is, would have pointed out the genre indicator 162, it has pointed out and that is not right to Step S209, it will progress to Step S201. At Step S209, change the value of the variable CurGenre according to the right and left of an input button, and the present genre of a list is changed, the value of the variable CurProgram is changed so that the program which may have had the program belonging to the new genre searched with Step S210 may be rearranged in order of what has early recording time and the program of the head may be referred to and it returns to Step S201.

[0038] At Step S211, if an input button is the determination button 128 or the reproduction button 129, it will progress to Step S212, otherwise, will progress to Step S215. The screen that asks whether resume reproduction from the part which ended reproduction immediately before or reproduce from the head of a program is displayed and a user is made to choose about the program which the variable CurProgram points out, namely, the program which the selection cursor 173 points out, at Step S212.

At Step S213, the reproduction starting position obtained by the variable PlayProgram at Step S212 in the value of the variable CurProgram is substituted for the variable PlayPosition, respectively, and it shifts to reproduction mode. When not having reproduced once with reference to the reproduction history of the selected program, it does not ask in Step S212, but reproduces from the head of a program. For example, it asks whether resume reproduction from the part (part that ended the last reproduction) which passed about 45 minutes from the head about the program of the 2nd line with the selection cursor 173, if the determination button 128 is pushed in the state of drawing 7 or reproduce from the head of a program, reproduction is performed from the part that the user chose.

[0039] At Step S215, if an input button is the reservation button 121, it will change to reservation screen mode and in Step S217, if an input button is the tuner button 122, it will change to the tuner operation mode.

[0040] Next, it is explained in details, referring to the flow chart of drawing 10 for the operation processing in the reproduction mode of the program recording playback equipment in an embodiment of the invention. If it changes from other modes to reproduction mode by the depression of the determination button 128 or the reproduction button 129 as the table of drawing 3 showed, operation processing will be performed

according to the flow chart «program reproduction» of drawing 10. At Step S301, ordinary reproduction is first started from the time position shown by the variable PlayPosition about the picture recording program that the variable PlayProgram shows. Next, it progresses to Step S302 and waits for the button input of a remote controller. If there is a button input, it will progress to Step S303, when an input button is viewing the stop switch 130, the reservation button 121, the tuner button 122 or a button 123, it progresses to Step S304, otherwise, it progresses to Step S307. At Step S304, suspend the present picture recording program reproduction, and the variable PlayProgram is changed so that the picture recording program that was under reproduction may be referred to, this reproduction state and reproduction stop position in reproduction mode are made to reflect in the reproduction history of the picture recording program, the reproduction stop position is set as the variable PlayPosition at Step S305, and as shown on the table of drawing 3, according to an input button, it changes to the tuner operation mode, reservation of picture recording mode or view program selection mode. By thus, the thing for which a program and a playback position when it stops at Step S304 are held to the variables PlayProgram and PlayPosition. When the reproduction button 129 is pushed from the tuner operation mode or reservation of picture recording mode and it changes to reproduction mode, it can play,

view the continuation of a program that suspended playback immediately before.

[0041] At Step S307, if an input button is one special reproduction button of the rewind button 131, the fast forward button 132 or the pause button 133, and that is not right to Step S308, it will progress to it at Step S309. At Step S308, special reproduction corresponding to an input button is performed, and it returns to Step S302. At Step S309, if an input button is the reproduction button 129, Step S310 will be performed, otherwise, it will return to Step S302. In Step S310, if the present special reproduction is performed, it will return to ordinary reproduction and will return to Step S302.

[0042] When reflecting a reproduction history in Step S304, the part that performed special reproduction also prevents the display of the reproduction history graph of the view program selection picture 161 becoming complicated by regarding as what was reproduced like ordinary reproduction. When perform ordinary reproduction for 10 minutes, fast forwarding reproduction is carried out continuously for 5 minutes, rewinding reproduction is carried out for 3 minutes and it stops as specifically shown on drawing 14 for example, a reproduced field becomes for 15 minutes after a reproducing starting point, and a reproduction end point becomes a position for 12 minutes from a reproducing starting point.

[0043] When the picture recording program under reproduction is reproduced to the last by reproduction mode, another flow chart «an end of a program» of drawing 10 is called. The next program of the picture recording program first reproduced to the last at Step S321 is chosen. The variables CurGenre and CurProgram in view program selection mode are more specifically referred to, if there is the next program (program chosen with the down button 125 in operation in a view program selection picture) of the picture recording program shown on the program list in the genre shown by CurGenre in view program selection mode by CurProgram, it chooses as a program that reproduces it next, and progresses to Step S322, and if there is nothing, reproduction mode will be ended as a thing without the program reproduced next, and it will change to the tuner operation mode. At Step S322, the program reproduced next and its head position are set as the variables PlayProgram and PlayPosition, respectively, it returns to Step S301 and reproduction is continued.

[0044] At the above 1st embodiment, efficient program selection becomes possible by displaying the reproduction history graph 171 with which a reproduction history is visually expressed in the view program selection picture 162 and its image as the thumbnail image 170.

[0045] Next, the screen constitution in the reservation of picture recording mode in the 2nd embodiment of this invention is explained in details, referring to drawing 11. It differs in that the number of times selected area 149 of recording preservation for the reservation of picture recording screen 141 in this embodiment inputting the number of times of recording preservation to the reservation of picture recording screen of the 1st embodiment and saving is added.

[0046] When reserving so that it may record on specified time zones, such as a weekly specific day of the week, in the number of times selected area 149 of recording preservation repeatedly in the recording day selected area 143 of reservation of picture recording like the «every week month» and «gold from the month», a minute is saved how many times from a part for the newest recording of the picture recording program, and it is provided in order to set up eliminate a part for recording older than it automatically. By the reservation entry that specifically has the reservation cursor 147 in drawing 11, recording time is 21:00 to 22:00 of «every week gold», and the number of times of preservation has become 3 times. In this case, gold, 20th three batches are recorded in gold, the 13th and the same month in gold, December 6 and the same month, for example, in the case of the recording on gold,

December 27 that is a recorded part next time, a recorded part on gold, December 6 will be eliminated automatically, and broadcast of 27th gold will be recorded.

[0047] Next, the screen constitution in the view program selection mode in the 2nd embodiment of this invention is explained in details, referring to drawing 12. The view program selection picture 161 in this embodiment receives the view program selection picture of the 1st embodiment, when displaying on a list the picture recording program to which recording was carried out at specified time zones, such as a weekly specific day of the week, repeatedly, it differs in that divide as these individual programs and do not display, but collect as one program and it displays.

[0048] The picture recording program that specifically has the selection cursor 173 in drawing 12 is an example of the contents of recording of a reservation entry with the reservation cursor of the reservation of picture recording screen 141 in drawing 11. Three batches are recorded from 21:00 to 22:00 on Friday every week, and each recording day of this picture recording program will be 20 days in the same month on the 13th in December 6 and the same month. And it is shown that the selection cursor 173 has chosen a part for the December 6 recording of the program.

[0049] There are 2 kinds of operational modes of the selection cursor 173 to a repetition picture recording program, whole selection mode and individual selection mode, and it is explained in details using drawing 13. Whole selection mode is the mode that chooses number of a plurality of group recorded repeatedly as one program, and the selection cursor 173 makes the shape shown on drawing 13 (a). Individual selection mode is the mode that chooses one of the programs which were recorded repeatedly, and to restore, and makes the shape shown on drawing 13 (b), (c). In drawing 13 (b), individual selection of a recorded part on December 6 is made, and individual selection of a recorded part on December 13 is made in drawing 13 (c).

[0050] The transition operation between whole selection mode and individual selection mode, as shown on drawing 13, the program in which individual selection is made by the depression of the up button 124 and the down button 125 in individual selection mode to whole selection mode again from individual selection mode by the depression of the left button 126 is changed into individual selection mode from whole selection mode by the depression of the right button 127.

[0051] About the reproduction history graph 171 and the reproduction end line 172, the rectangle showing ending with reproduction is held for every program and the reproduction end line 172 is made to express the

time of finally ending reproduction among each program. The program that specifically has the selection cursor 173 in drawing 12 is in the state where played a recorded part on December 20 first for about 1 hour, then played from the beginning by having made a part for all the recording into the package program, and it played till about 45 recorded minutes on December 13. That is, all recorded parts are played on December 6, a recorded part is played about 45 minutes on December 13, a recorded part is played for about 1 hour on December 20, and the reproduction end line has pointed out the hit where it passed for the December 13 recording that finally suspended playback about 45 minutes.

[0052] When playing the program of the selection cursor 173, in whole selection mode, a part for each recording is judged one program, and it plays, and plays in individual selection mode by the method same about a part for each recording as the 1st example. If it specifically plays in selection cursor, like drawing 13 (a), it will ask a user whether play from a part with the reproduction end line 172 or play from the head for the December 6 recording that is a head as a whole. Since there is no reproduction end line 172 in the case of drawing 13 (b), reproduction is automatically performed from a head.

[0053] At the above 2nd embodiment, an operation body system it is easy search and user-friendly can be obtained by specifying the number of times of recording preservation in reservation of picture recording and the recording accompanied by automatic updating being achieved, and regarding as one program by view program selection about the program by which repetition recording was carried out.

[0054]

[Effect of the invention] In the 1st embodiment of this invention, whether when displaying the list of the picture recording programs that belong to the genre selected in the view program selection picture in addition to recording time or a channel number, it how far already played, and viewed to each program, since the thumbnail of the program is displayed, a program to view from many picture recording programs can be chosen easily, since the scene that ended the contents of the program and reproduction can be easily known if the thumbnail is an image at the time of ending reproduction immediately before, it becomes easy to choose a program further.

[0055] In the 2nd embodiment of this invention, the number of times of recording preservation can be specified about the program repeatedly recorded in a reservation of picture recording screen, a part for old recording can be eliminated automatically, and recording preservation can be carried out by the newest

number of times of specification, in a viewing selection picture, selection of a program becomes easier by displaying such a program by which repetition recording is carried out as one program and choosing it. Thus, in a sequential storage like the conventional tape, realization can harness the difficult random access storage and an operation body system with sufficient reliance user-friendliness can be provided.

[Brief description of the drawings]

[Drawing 1] is a block diagram showing an example of the hardware constitutions of the program recording playback equipment as an embodiment of the invention.

[Drawing 2] is a top view showing a part of example of button arrangement of the remote controller in this embodiment.

[Drawing 3] is a table showing the change state to button grabbing of the operational mode in this embodiment.

[Drawing 4] is an explanatory view showing the display example of the reservation of picture recording screen of the program recording playback equipment as the 1st embodiment of this invention.

[Drawing 5] is an explanatory view showing an example of the genre used on a reservation of picture recording screen etc.

[Drawing 6] is a flow chart which shows the procedure in the reservation of picture recording mode of the program recording playback equipment as the 1st embodiment of this invention.

[Drawing 7] is an explanatory view showing the display example of the view program selection picture of the program recording playback equipment as the 1st embodiment of this invention.

[Drawing 8] is an explanatory view showing another display example of the view program selection picture of the program recording playback equipment as the 1st embodiment of this invention.

[Drawing 9] is a flow chart which shows the procedure in the view program selection mode of the program recording playback equipment as the 1st embodiment of this invention.

[Drawing 10] is a flow chart which shows the procedure of the reproduction mode of the program recording playback equipment as an embodiment of the invention.

[Drawing 11] is an explanatory view showing the display example of the reservation of picture recording screen of the program recording playback equipment as the 2nd embodiment of this invention.

[Drawing 12] is an explanatory view showing the display example of the view program selection picture of the program recording playback equipment as the 2nd embodiment of this invention.

[Drawing 13] is an explanatory view showing the display example of the selection cursor in the view program selection picture of the program recording playback equipment as the 2nd embodiment of this invention.

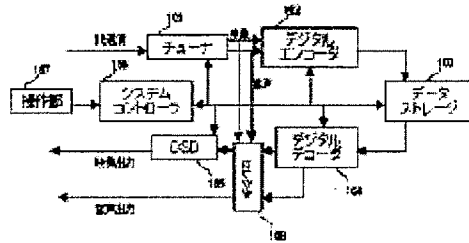
[Drawing 14] is a key map showing an example of the calculating method of the reproduction history at the time of the reproduction including special reproduction.

[Description of numerals]

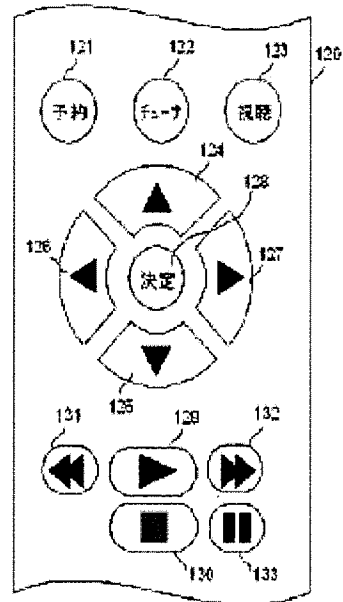
- 101 Tuner
- 102 Digital encoder
- 103 Data storage
- 104 Digital decoder
- 105 OSD
- 106 System controller
- 107 Final controlling element
- 108 Selector
- 120 Remote controller (part)
- 121 Reservation button
- 122 Tuner button
- 123 Viewing button
- 124 Up button
- 125 Down button
- 126 Left button
- 127 Right button
- 128 Determination button
- 129 Reproduction button

130 Stop switch
131 Rewind button
132 Fast forward button
133 Pause button
141 Reservation of picture recording screen
142 Channel number selected area
143 Recording day selected area
144 Video recording start time selected area
145 Recording finish time selected area
146 Genre selected area
147 Reservation cursor
148 Input focus
149 Number of times selected area of recording
preservation
161 View program selection picture
162 Genre indicator
163 Thumbnail indication field
164 Channel viewing area
165 Recording date viewing area
166 Recording day of the week viewing area
167 Video recording start time viewing area
168 Recording finish time viewing area
169 Reproduction history display field
170 Thumbnail image
171 Reproduction history graph
172 Reproduction end line
173 Selection cursor

Drawing 1



Drawing 2



Drawing 3

【図3】

	予約	予約	視聴	決定
予約画面	—	予約画面へ	視聴画面へ	—
予約画面 キャンセル	予約画面へ	—	視聴画面へ	予約画面へ
予約画面 予約解除	—	—	—	予約画面へ
視聴画面 視聴解除	予約画面へ	予約画面へ	—	予約画面へ
視聴画面	予約画面へ	予約画面へ	視聴画面へ	—

	上	下	左	右	決定	戻る
予約画面	—	—	—	—	—	予約画面へ
予約画面 キャンセル	上へ	下へ	—	—	—	予約画面へ
予約画面 予約解除	上へ	下へ	左へ	右へ	—	—
視聴画面	上へ	下へ	左へ	右へ	—	—
視聴画面 視聴解除	上へ	下へ	左へ	右へ	—	—
視聴画面	上へ	下へ	左へ	右へ	—	—

Drawing 5

Drawing 4

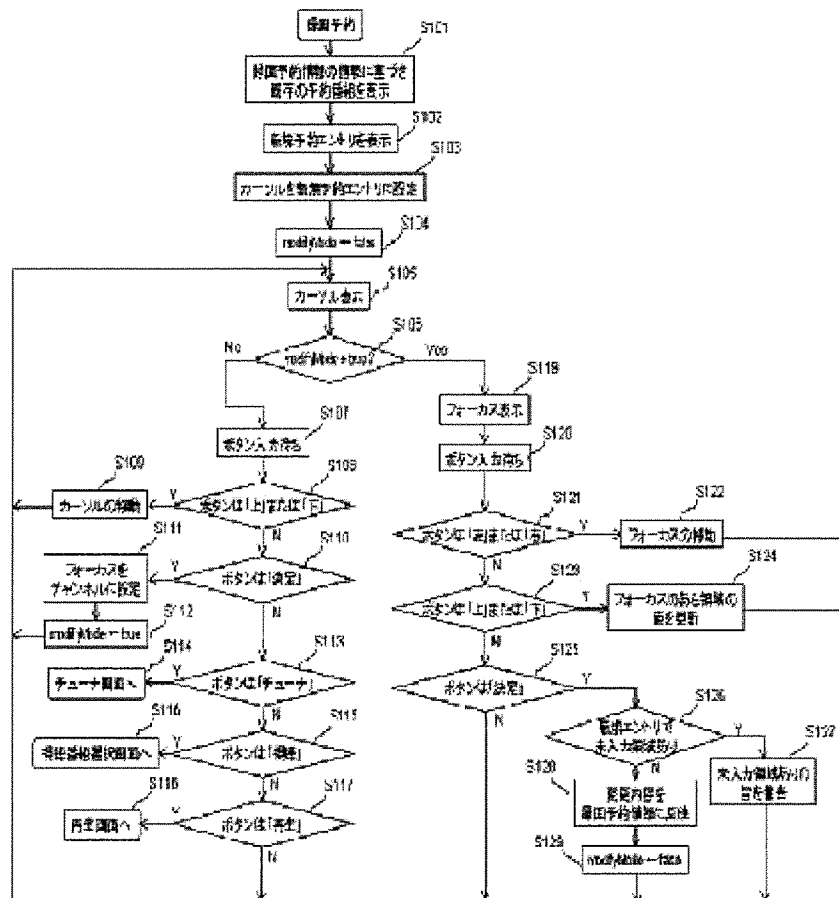
【図4】

【図5】



録画予約				
CH	日	開始	終了	ジャンル
8	11(水)	18:00	20:00	ドラマ
10	12(木)	21:00	23:00	映画
16	18(土)	20:00	22:00	映画
14	14	14	14	14

Drawing 6



Drawing 7

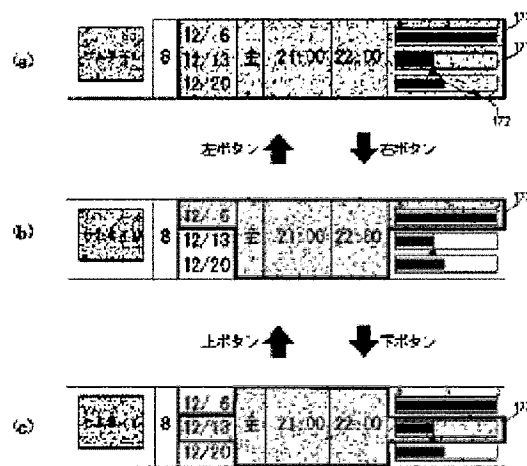
ジャンル 映画						
	09	月日	曜日	開始	終了	再生機能
171	10	12/12	木	21:00	23:00	171
	6	12/13	土	20:00	23:00	172

163 164 165 166 167 168 169

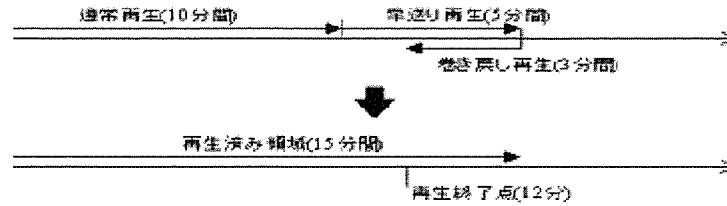
Drawing 8

ジャンル すべて						
	09	月日	曜日	開始	終了	再生機能
171	8	12/11	水	18:00	20:00	171
172	10	12/12	木	21:00	23:00	172
173	6	12/14	土	20:00	23:00	173

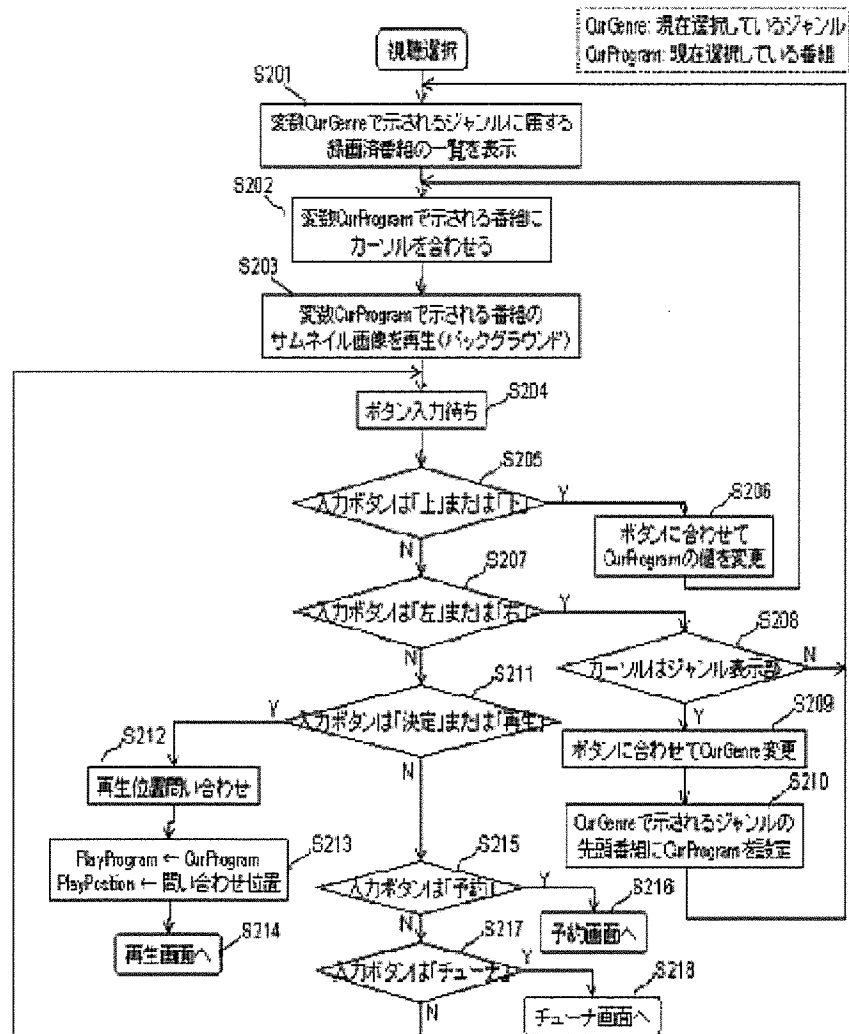
Drawing 13



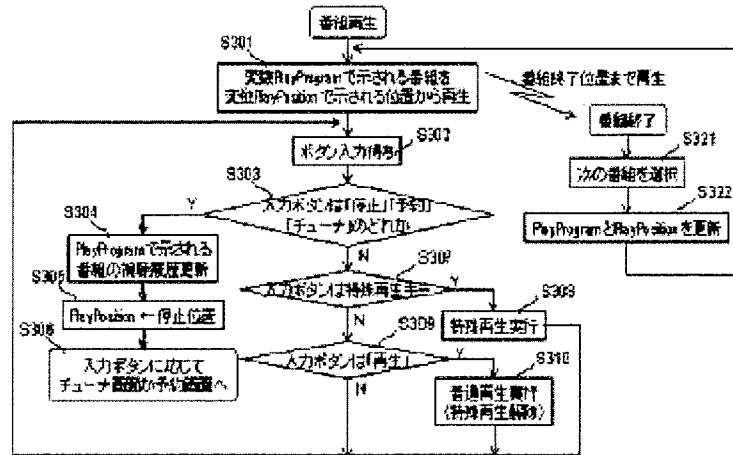
Drawing 14



Drawing 9



Drawing 10



Drawing 11

録画予約					
CH	日	開始	終了	ジャンル	録画回数
8	11(水)	18:00	20:00	ドラマ	-
8	12(金)	21:00	22:00	ドラマ	1

Drawing 12

ジャンル ドラマ						
	CH	月日	曜日	開始	終了	再生履歴
170	8	12/11	水	18:00	20:00	171
170	8	12/12	金	21:00	22:00	172